

Digital Array Gas Radiometer (DAGR), Phase II

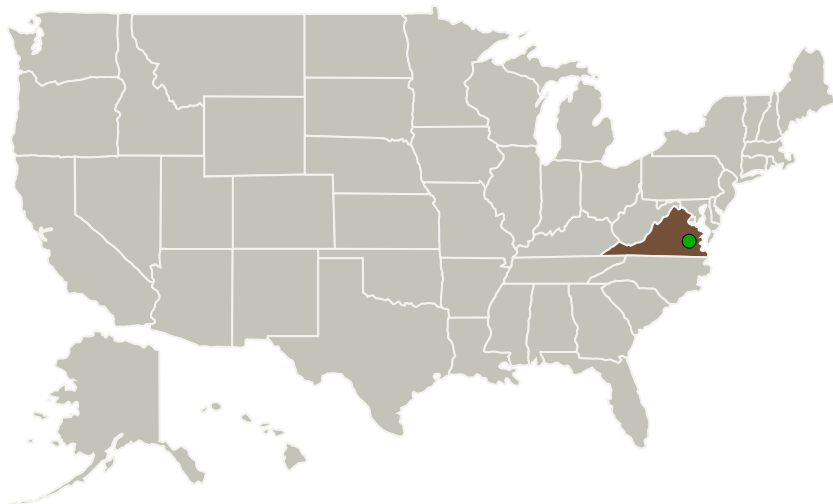
Completed Technology Project (2010 - 2012)



Project Introduction

The digital array gas radiometer (DAGR) is a new sensor design for accurate measurement and monitoring of trace gases in the boundary layer from space, aircraft, or ground-based platforms using scattered sunlight. Target gases include CH₄, CO, CO₂, N₂O and other species critical to climate science, environmental monitoring and commercial pollution compliance efforts. The DAGR approach builds on traditional gas-filter correlation radiometry (GFCR), a well-known and proven technology for trace gas sensing. The effectiveness of GFCR, however, has historically been limited in downlooking applications primarily because variations in surface albedo degrade its performance. In our Phase I effort, we investigated and demonstrated the ability of the DAGR design to overcome these limitations. With the successful completion of these feasibility studies, the technology has been increased to TRL-3. In the Phase II effort, we will construct and test a prototype DAGR sensor for CH₄ detection and monitoring, advancing the technology to TRL-5. CH₄ was chosen as our target gas to meet the pressing commercial need for an improved natural gas leak detection system. For NASA, the DAGR prototype will significantly advance the technology needed for future missions such as ASCENDS, GEOCAPE, and GACM. DAGR represents a major advance in using backscattered light for detecting concentrations of key molecular species.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
GLOBAL ATMOSPHERIC TECHNOLOGIES AND SCIENCES(GATS)	Lead Organization	Industry	Newport News, Virginia
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Virginia

Project Transitions

**January 2010:** Project Start**May 2012:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/138939>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

GLOBAL ATMOSPHERIC TECHNOLOGIES AND SCIENCES (GATS)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Larry L Gordley

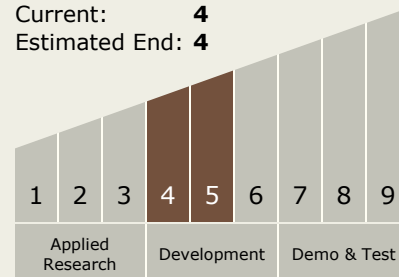
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Technology Maturity (TRL)

Start: **5**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System